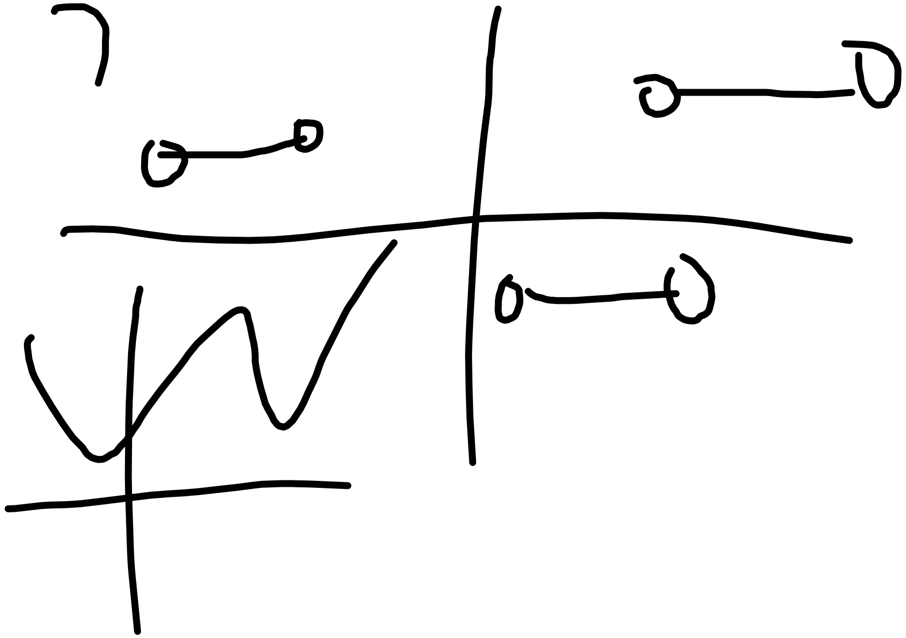
$y = mx + b$ line $\quad y' = m$

$y = \frac{3}{5}x - 7$

$y' = \frac{3}{5}$



13.

$$y = 4x^3 + 21x^2 + 36x - 20$$

$$\frac{dy}{dx} = 12x^2 + 42x + 36$$

$$12x^2 + 42x + 36 = 0$$

$$6(2x^2 + 7x + 6) = 0$$

$$6(2x+3)(x+2) = 0$$

$$x = -2 \text{ or } -\frac{3}{2}$$

1st der
Incr. $f' > 0$
dec. $f' < 0$
max & min. $f' = 0$

$6 \cdot (-3.5+3)(-1.75+2)$

$\boxed{f'}$ + 0 − 0 +

x -2 $-\frac{3}{2}$

f Increasing $\rightarrow (-\infty, -2) \cup \left(-\frac{3}{2}, \infty\right)$ because $f' > 0$

f Decreasing $\rightarrow \left(-2, -\frac{3}{2}\right)$ because $f' < 0$

at $x = -2$, rel. max because f' goes from + to −.

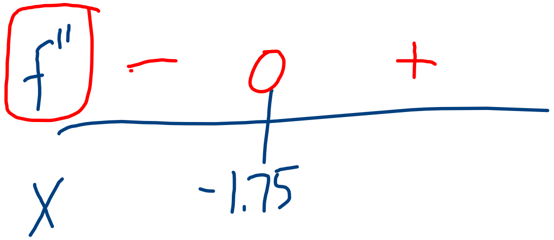
at $x = -\frac{3}{2}$, rel. min because f' goes from − to +.

$$\frac{dy}{dx} = 12x^2 + 42x + 36$$

$$y'' = 24x + 42$$

$$24x + 42 = 0$$

$$x = -1.75$$



Concave down → $(-\infty, -1.75)$ because $f'' < 0$

concave up → $(-1.75, \infty)$ because $f'' > 0$

Point of Infl. at $x = -1.75$ because $f'' = 0$, and f'' goes from $-$ to $+$.

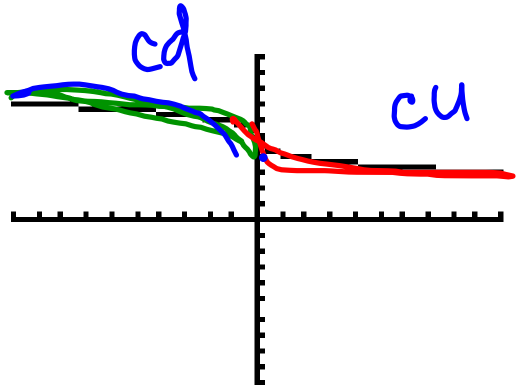
$$y = 5 - x^{1/3}$$

$$y' = -\frac{1}{3}x^{-\frac{2}{3}} = -\frac{1}{3x^{2/3}}$$

	dec.	v.t.	dec.
f'	$-$	d.n.e.	$-$
x		0	

d.n.e exist 0

jump
cusp
corner
vertical tang.



$$y'' = \frac{2}{9}x^{-\frac{5}{3}} = \frac{2}{9x^{5/3}}$$

f''	$-$		$+$
x		0	

2nd der.

$f'' > 0 \rightarrow$ concave up

$f'' < 0 \rightarrow$ concave down

$f'' = 0 \rightarrow$ possibly a pt. of infl.